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For the President of the European Patent Office

[signature]

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Sheet 2 of the certificate

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Method for the prioritized processing of information

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Method for the Prioritized Processing of Information

The present invention relates to a method for the prioritized processing of information according to the preamble of claim 1.

In EP 0 797 818 B1 a method is provided for radio communication between central and peripheral units, in particular for a traffic control system which, on the one hand, allows bi-directional communication between the aforementioned units and which, on the other hand, allows direct communication in the vicinity between individual peripheral units, such as for example between buses or between a bus and a fixed unit, for example a traffic light system. As a result, the scarce frequency resource may be optimally utilized.

With increasing traffic density and the installation of additional services, such as for example situation-dependent passenger information systems, the few allocatable radio channels prove to be bottlenecks for communicating information which is to be processed as a priority.

EP 0 952 565 A2 discloses a vehicle communication system and a method for dynamic allocation of channels which, by means of distributed base stations, allows a plurality of vehicles to communicate with one another and with a central station.

The cost of positioning base stations and the great complexity of the proposed solution are disadvantageous.

The object of the present invention, therefore, is to provide a method which, by retaining the known infrastructure, in

particular for a traffic control system, allows the prioritized processing of information without adversely affecting the throughput of information.

Moreover, it should only be possible to output such information to be processed as a priority from authorized peripheral units.

This object is achieved by the measures provided in claim 1. Advantageous embodiments of the invention are provided in further claims.

By means of the method steps provided in claim 1, a peripheral unit may correctly process an information unit directly received from a further peripheral unit, without any delay and without a central unit being involved in this communication. As a result, it is ensured that, for example, the indication of the departure of a bus on a display unit is cancelled immediately upon departure of the relevant bus and passengers arriving only very slightly late at the bus stop do not receive false information about a bus which, apparently, is yet to arrive.

Thus the following advantages may be additionally provided:

i) because the individual peripheral units (11, 15) communicate with one another on a different frequency from the frequency which is used for communication between the at least one central unit (11) and the peripheral units (12, 15); the transmission capacity is not adversely affected during the communication between the at least one central unit and the peripheral units (claim 2).

ii) because the individual peripheral units (11, 15) communicate with one another on the same frequency as is used for communication between the at least one central unit (11) and the peripheral units (12, 15), but the transmitter power for communication between the individual peripheral units is reduced to such an extent that the transmission range is limited to the immediate vicinity of a peripheral unit; no further infrastructure needs to be installed for communication between the peripheral units and the transmission capacity is thus not adversely affected during the communication between the at least one central unit and the peripheral units (claim 4).

iv) because the second information unit (INF2) contains a field (COMMAND2) which specifies the type of prioritized processing;
it is possible to specify the type of prioritized processing directly from an operating status in the receiving and/or transmitting peripheral unit (claim 5).

The invention is described hereinafter in more detail with reference to the drawings by way of example, in which:

Figure 1 shows an overview of the communication relations between a central unit and peripheral units;

Figure 2 shows an overview of the system for implementing the method according to the invention.

Figure 1 shows at least one central unit 10 which functions as a control center for a traffic control system and peripheral units 11 and 12 which are each allocated to one respective

omnibus - referred to as "bus" hereinafter. Moreover, a further peripheral unit 15 is shown as a display unit at a bus stop.

The communication between the central unit 10 and the peripheral units 11, 12 and 15 takes place using the multiplex method in which each peripheral unit is allocated a time slot. Additionally, a time slot may be provided which is commonly available as a so-called broadcast channel to all communication participants, i.e. all peripheral units 11, 12 and 15 and the at least one central unit 10. Information units INF1 are communicated to the peripheral units from the central unit 10. Such information units INF1 are also known by the term "telegram". The structure of such an information unit INF1 may, for example, be taken from the following Table 1.

Name	Contents, Example
..	
Descriptor	Describes the structure of the information unit
INFO11	Display Content Part 1
INFO12	Display Content Part 2
KEYCODE1	Key Code 1
KEYCODE2	Key Code 2
..	

Table 1

The structure of the first information unit INF1 is provided in the DESCRIPTOR field, i.e. in particular which fields are contained therein and details about the length of this information unit. In this view according to Table 1 it is

assumed that such an information unit INF1 is communicated to a display unit 15 on the basis of reported local information regarding a bus 11. The display contents are contained in the fields INFO11 and, if required, additionally in a further field INFO12, for example the sequence "31;15.32; Schlieren" is located in the field INFO11. The symbol ";" is thus a separator which separates the contents. This display content is shown on the display unit 15 itself according to Table 2:

Line	Departure	Direction
31	15.32	Schlieren

Table 2

Together with the display content INFO11 an associated key code KEYCODE1 is also transmitted and is buffer stored in the control section of the display unit 15.

An information unit INF1 with a structure comparable to Table 1 is also transmitted from the central unit 10, for example on the basis of the reported local information regarding a bus, and is buffer stored in an on-board computer of the bus. In particular, the information unit INF1 on a bus contains the identical key code KEYCODE1 which has been communicated to a display unit as well as the route number in a field COURSE. The key code KEYCODE1 may, for example, be formed from the vehicle number.

A second information unit INF2 is communicated from the peripheral unit 11 in the bus 21 - see Figure 2 - according to a representation in Table 3:

Name	Contents, Examples

KEYCODE2	Vehicle Number
COMMAND2	Action, Command, e.g. delete
..	

Table 3

In the field COMMAND2, there may be the instruction, for example, to delete the relevant lines in the display unit. If, when the second information unit INF2 is received, the control section of the display unit 15 detects that the key code KEYCODE2 transmitted therein is identical to the previously transmitted key code KEYCODE1, the content of the field COMMAND2 is executed by the control section. This is possible due to the allocation of KEYCODE1 to INFO11, which has resulted according to the transmission of the first information unit INF1. The second information unit INF2 may have a fixed structure or, as in the case of the first information unit INF1, a variable structure. If a variable structure is present, a field DESCRIPTOR2 is additionally provided. The unidirectional communication relation shown in Figure 1 may also be of a bi-directional type.

Figure 2 shows a system overview in which the implementation of the method according to the invention is described in more detail. A bus stop 26 has at least one display unit 25, on which the imminent departures of buses are shown. A bus 21 has arrived at the bus stop 26. A control center is formed from at least one operator station 20 and one computer system 23 as well as from radio transmission equipment including at least one antenna mast 24, which provides radio coverage for one zone of a local traffic operator. It is assumed that a first

information unit INF1 has already been transmitted and the key code KEYCODE1 contained therein has been buffer stored in the on-board computer. The driver locks the doors immediately before departure. The actuation of the door locking signals to the on-board computer to pack the key code KEYCODE1 including a command COMMAND2 into a second information unit INF2 - see Table 3 - and to transmit it in a time slot provided in the radio transmission interface. This information unit INF2 is received by the control section of the display unit 25 and a comparison is made to determine whether a key code KEYCODE1 has previously been stored and corresponds with the transmitted key code KEYCODE2. If correspondence is detected, the display "31.15.32 Schlieren" is deleted because of the content of the field COMMAND2.

The method according to the invention may also be used for the arrival of a bus at a bus stop. To this end, the instruction "flashing" is provided in the field COMMAND2. If the aforementioned condition is fulfilled when the second information unit INF2 is received in the control section of the display unit 25, this content of the field COMMAND2 causes the departure time information "15.32" to be masked in the view according to Figure 2 and the information "Line" and "Destination" is shown flashing. As a result, the passengers in the area of the bus stop are made aware of the immediate departure of the relevant bus.

In the first information unit INF1, it may also be provided in the key code KEYCODE1 or, additionally, that details about the validity and/or life of the key code are included. For example, it may be provided that the key code is expended after a single use or when a specific command COMMAND2 is used and has no further effect in the receiving peripheral unit

when transmitted again by means of a further second information unit INF2.

The method according to the invention is not restricted to communication between a bus 21 and a display unit 25. A particularly advantageous application is the decentralized back-up connection which is only initiated by the control center, i.e. by a transmission of a first information unit INF1 to both buses, generally shuttle transport vehicles. To back-up the connection, both buses in the region of the bus stop may directly communicate via second information units INF2, in order to ensure a connection for the passengers. The driver may thus be assisted by a corresponding display on a control unit allocated to the on-board computer.

A further use of the method according to the invention is the arrival of buses in a depot; possible actions are thus instructions for specific vehicle maintenance or the loading of data in the on-board computer by means of a mass storage unit.

For the wireless transmission of the second information unit INF2, distances in the area of the bus stop in the order of a few meters up to approximately 100 m are to be covered. In an advantageous development of the method according to the invention it may be provided to carry out this transmission, for example, in a broadcast channel and thus to reduce the transmitter power to such an extent that a minimum reception field strength is ensured in the aforementioned area of the bus stop. In an alternative embodiment, a different frequency may also be used and, if required, additionally deployed on a transmission method standardized for such purposes. Bluetooth

technology is suitable, in particular, for the immediate vicinity of the bus stop.

It is also possible to carry out the communication in the infrared range.

The use of the method according to the invention is not restricted to communication for the local traffic area. This method may be used anywhere where a direct temporary communication is required between peripheral units, but this communication should, if possible, take place without direct control by a central unit. For example, with the method according to the invention, a temporary communication may be implemented between individual terminals of a cellular trunked radio system.

List of Reference Characters Used

10	Central unit
11	Peripheral unit
12	Peripheral unit
15	Peripheral unit
20	Operator station of the control center
21	Bus as peripheral unit
23	Computer system of the control center as part of a central unit
24	Antenna mast
25	Display unit as peripheral unit
26	Bus stop

Claims

1. A method for the prioritized processing of information which is transmitted in a wireless communication between central (10) and peripheral units (11, 12, 15) of a traffic control system, first information units (INF1) being communicated from at least one central unit (10) to the peripheral units (11, 12, 15) and communication between individual peripheral units (11, 12, 15) being able to be established via second information units (INF2), characterized in that for communication between the individual peripheral units (11, 12, 15) a second information unit (INF2) is then processed by a peripheral unit (11, 12, 15) as a priority, if said peripheral unit has previously received a key code (KEYCODE1) transmitted in the first information unit (INF1) and said key code coincides with the key code (KEYCODE2) contained in the second information unit (INF2).

2. The method as claimed in claim 1, characterized in that the individual peripheral units (11, 15) communicate with one another on a different frequency from the frequency which is used for communication between the at least one central unit (11) and the peripheral units (12, 15).

3. The method as claimed in claim 2, characterized in that communication between the individual peripheral units (11, 15) takes place in the infrared range.

4. The method as claimed in claim 1, characterized in that the individual peripheral units (11, 15) communicate with one another on the same frequency as is used for communication between the at least one central unit (11) and the peripheral units (12, 15) but that the transmitter power for

communication between the individual peripheral units is reduced to such an extent that the transmission range is limited to the immediate vicinity of a peripheral unit.

5. The method as claimed in one of claims 1 to 4, characterized in that the second information unit (INF2) contains a further field (COMMAND2) which specifies the type of prioritized processing.

6. The method as claimed in one of claims 1 to 4, characterized in that the transmitted key code (KEYCODE1, KEYCODE2) contains information which specifies the type of prioritized processing.

7. The method as claimed in one of claims 1 to 6, characterized in that after prioritized processing has been completed, the key code (KEYCODE1, KEYCODE2) in the relevant peripheral unit (11, 12, 15) is expended.

Abstract

A method is proposed for the prioritized processing of information. This information is transmitted in a wireless communication between central (20, 23, 24) and peripheral units (21, 25) of a traffic control system, first information units (INF1) being communicated from at least one central unit (20, 23, 24) to the peripheral units (21, 25), and communication between individual peripheral units (21, 25) being able to be established via second information units (INF2). For communication between the individual peripheral units (21, 25) a second information unit (INF2) is then processed by a peripheral unit as a priority, if said peripheral unit has previously received a key code (KEYCODE1) transmitted in the first information unit (INF1) and said key code coincides with the key code (KEYCODE2) contained in the second information unit (INF2). With this prioritized processing, for example, display contents of display units may be updated immediately upon the departure of a bus.

(Figure 2)

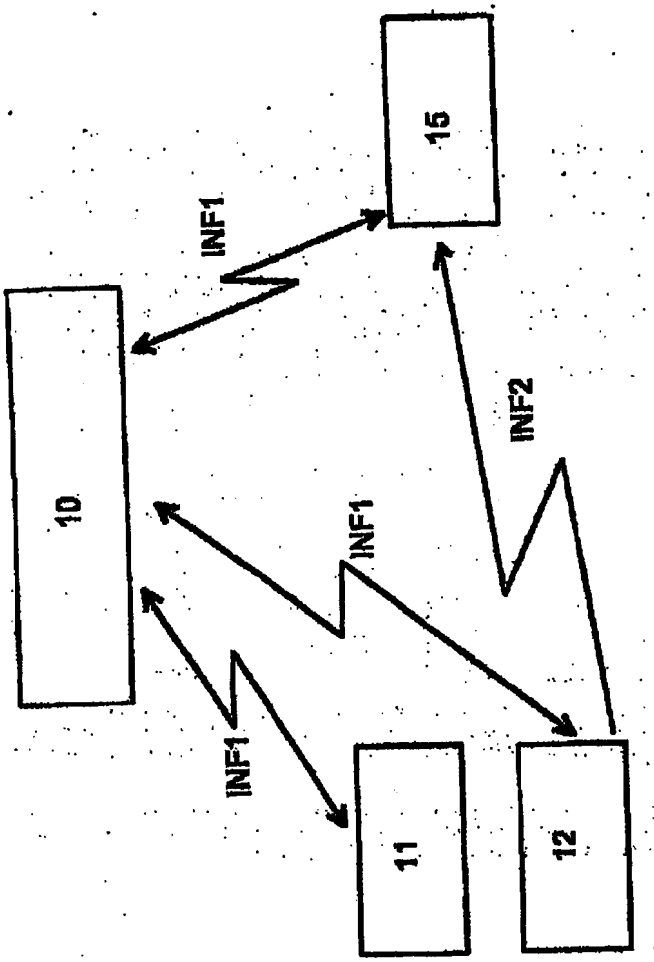

Fig.1

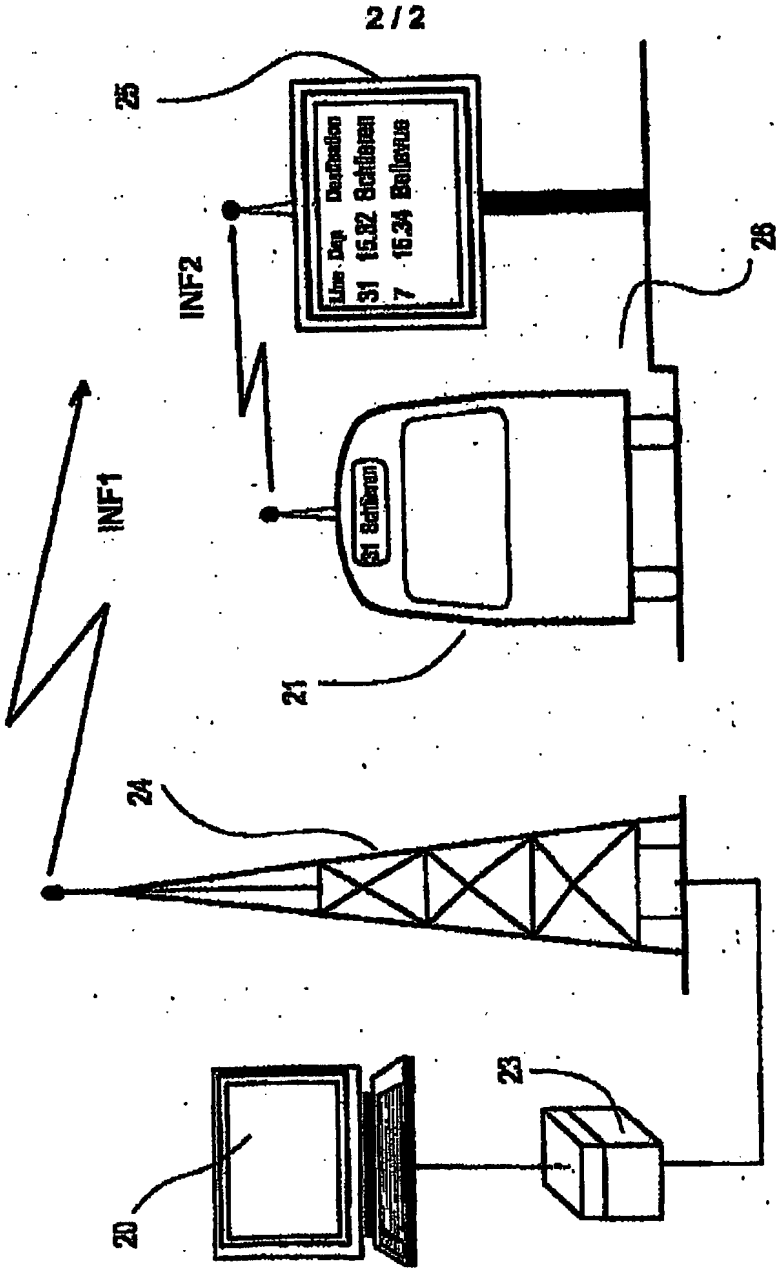
25
Dep Destination
31 15.32 Schiphol
7 15.34 Baltavia
INF2
26
INF1
21
24
23
20

Fig.2